the support member for receiving the male member. In a steer-by-wire steering system, the input shaft is not mechanically linked to the steered road wheels and, thus, ordinarily does not have an end of travel limit. The present invention advantageously employs a stop position in the female receptacle for limiting rotational travel of a steering input shaft in a steer-by-wire steering system. Thus, the present invention provides an end of travel limit to a steering system to does not otherwise have such a limit.

The reference to Hanger, Jr. discloses a mechanically linked steering mechanism for a vehicle having a steering wheel (1) secured at the upper end of a rotatable steering post (2). The steering post (2) in Hanger, Jr. has a worm gear (11) mechanically engaging teeth of arm (11a) of a sector connected to a mechanism for steering wheels of the vehicle. Thus, the steering post (2) in Hanger, Jr. is mechanically linked to the steered wheels of the vehicle via arm (11a) and worm gear (11).

In contrast, Applicants' claimed invention, as set forth in claim 1 recites a steer-by-wire steering system for steering one or more road wheels on a vehicle. Applicants steer-by-wire steering system comprises a steering input device rotatable by an operator to command steering of the one or more road wheels, and a steering input shaft mechanically connected to the steering input device and rotatable in response to rotation of the steering input device. In Applicants' steer-by-wire steering system, the steering input shaft is not mechanically linked to the steered one or more road wheels. Additionally, Applicants claimed steering system includes a support member disposed proximate to the steering input shaft, a male member provided on one of the steering input shaft and the support member, and a female receptacle provided on the other of the steering input shaft and the support member for receiving the male member. The female receptacle includes at least one stop position for limiting rotational travel of the steering input shaft. The claimed steering system further includes an actuator for rotating one or more wheels in the vehicle in response to rotation of the steering input device.

Applicants respectfully submit that the Examiner has failed to establish *prima facie* obviousness of the claimed invention in view of the Hanger, Jr. reference. Section 2143 of the latest addition of the *Manual of Patent Examining Procedures* (MPEP) states the following regarding the requirements for establishing a *prima facie* case of obviousness:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. [emphasis added]

Applicants submit that the Hanger, Jr. reference does not teach or suggest all of the claimed features of the invention. Nowhere does Hanger, Jr. teach or suggest a steer-by-wire steering system in which the steering input shaft is not mechanically linked to the steered one or more road wheels, and having a male member and female receptacle provided in the steering input shaft and a support member, with the female receptacle having at least one stop position for limiting rotational travel of the steering input shaft. Instead, the Hanger, Jr. steering system is a mechanically linked system in which the steering post (shaft) 2 is mechanically linked to the steered wheels of the vehicle.

The mechanically linked system of Hanger, Jr. is a conventional mechanical steering system in which the steering post is mechanically linked to the road wheels and thus the wheels define the end of travel limits of the steering wheel. The conventional steering system of Hanger, Jr. does not exhibit the problem that is unique to a steer-by-wire system for which Applicants' invention provides a solution. This problem solved by the present invention only occurs in steer-by-wire steering systems which do not have mechanical linkage between the steering wheel and the road wheels of the vehicle.

By employing Applicants' claimed invention, a steer-by-wire steering system, which conventionally does not have end of travel rotational limiters associated with the steering input shaft, is provided with a stop mechanism to limit travel of the steering input shaft. Claims 9 and 16 likewise include the same or similar above-discussed features of claim 1, which are not taught or suggested in the Hanger, Jr. reference.

Accordingly, Hanger, Jr. does not teach or suggest all of the claimed features of claims 1, 9, and 16, and thus would not have rendered the claimed invention obvious to one of ordinary skill in the art at the time of the present invention. Applicants therefore respectfully request withdrawal of the rejection of claims 1-3, 5, 6, 9-12, 14-18, and 20 under 35 U.S.C. §103(a).

The Examiner has indicated that claims 4, 7, 8, 13, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants appreciate the Examiner's acknowledgement of allowable subject matter; however, Applicants are of the position that independent claims 1, 9, and 16 are in condition for allowance, which action is respectfully solicited.

In view of the amendments and the above remarks, it is submitted that claims 1-20 define patentable subject matter and are in condition for allowance, which action is respectfully solicited. If the Examiner has any questions regarding patentability of these claims, the Examiner is encouraged to contact Applicants' undersigned attorney to discuss the same.

Respectfully submitted,

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